

Canada: Environmental Issues

Introduction

Canada's energy abundance has encouraged the development of a highly fuel-intensive economy based on natural resource extraction and processing. Canadian crude oil production, for example, increased from 1.47 million barrels per day (bbl/d) in 1984 to an estimated 2.8 million bbl/d in 2001. Increased Canadian oil output during the 1990s consisted largely of conventional heavy oil and synthetic oil (derived from tar sands and bitumen).

Processing of the tar sands during oil production requires significant amounts of water, resulting in a major environmental challenge in the disposal of solid waste (up to 10 tons of waste per ton of tar sand oil produced). In addition, oil and gas exploration is impacting indigenous lands along British Columbia.

Canada is also a large natural gas producer. In 1999, the country produced 6.3 trillion cubic feet. Though natural gas emits less carbon dioxide, production has its environmental downside. Large natural gas exploration projects (in addition to other mining, manufacturing, and timber operations) are placing pressure on the boreal (northern forest, one of the largest forest ecosystems in the world, covering 11% of the planet's land mass.

In broader terms, such a heavy reliance on energy-intensive industries has led to serious environmental concerns, primarily regarding air pollution and climate change. Minister of the Environment David

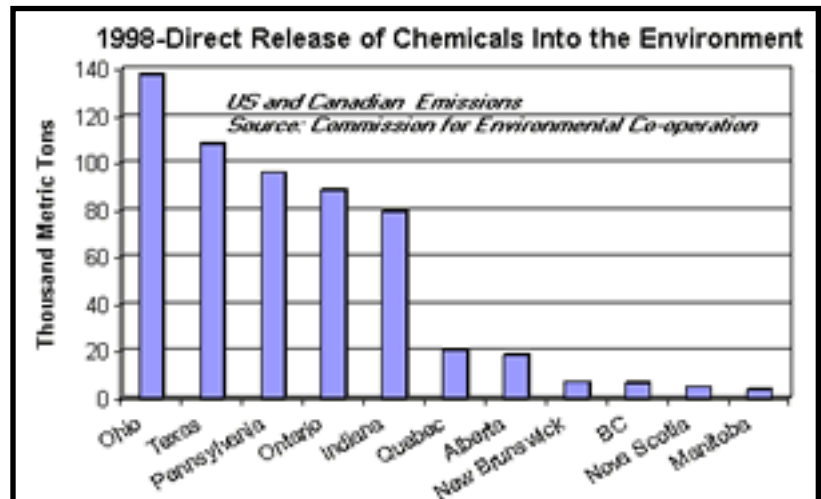


Anderson has indicated that two of his main priorities include negotiating an international agreement to reduce cross-border pollution and working with other federal departments and provinces to create a domestic agenda to meet international emissions reduction obligations under the Kyoto Protocol. As a signatory to the Kyoto Protocol and as an Annex I country, (Annex I countries include countries of the Organization for Economic Cooperation and Development and countries designated as Economies in Transition), Canada has agreed to reduce greenhouse gas emissions 5.2% below 1990 levels by the 2008-2012 commitment period.

Besides the United States, Canada also works in cooperation with Mexico, the third party in the Commission for Environmental Cooperation (CEC), a trinational organization established under the environmental side agreement to the North American Free Trade Agreement (NAFTA). The CEC addresses environmental concerns associated with increased trade in North America. Many energy-related environmental issues, such as air pollution and "acid rain," transcend international boundaries.

Air Pollution

As with most industrialized countries, Canada's large cities are faced with air pollution problems. In the summer of 2001, Toronto experienced a record number of smog alerts. Smog is blamed for thousands of premature deaths in Ontario each year. To address cross-border air pollution issues, Canada's Minister of the Environment has been negotiating with the United States under provisions of the Canada-US Air Quality Agreement

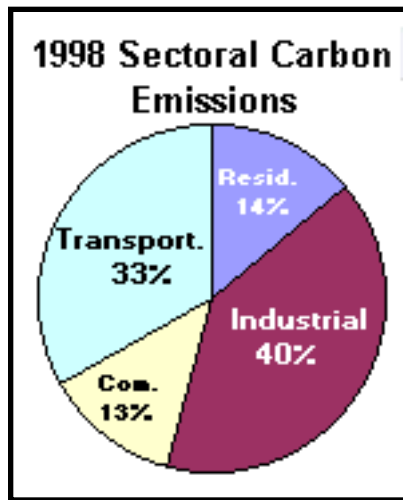


According to a report released by Environment Canada, a branch of the Canadian government, automobiles represent the single largest anthropogenic (man-made) source of air pollution in Canada. Cars are responsible for 60% of total emissions of carbon dioxide, carbon monoxide and volatile organic compounds. Moreover, the shift away from cars towards larger vehicles, such as Sports Utility Vehicles (SUV's) in recent years, is responsible for approximately 45% of the increase in emissions observed since 1990. Although Canada has benefited from fuel efficiency technologies over the same time period, improvements have not been great enough to compensate for the increasing popularity of SUV's. In addition to the pollutants mentioned above, SUV's also produce, on average, one-third more carbon dioxide per mile than the average passenger car.

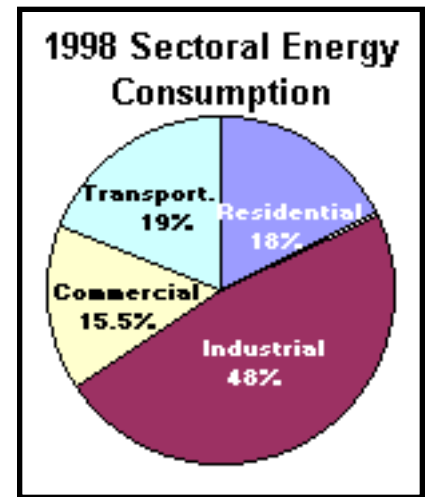
Energy Use and Carbon Emissions

Traditionally, Canada's oil and natural gas production has been concentrated mostly in Alberta, British Columbia, and Saskatchewan. However, with two big oil and gas projects under development off Canada's east coast, Newfoundland and Nova Scotia are emerging as areas of increased energy use. Sable Offshore Energy Project is a 3.5 trillion cubic feet (Tcf) natural gas project off Nova Scotia, that aims to

increase the supply of more environmentally -benign energy resources entering the United States. Construction of the new natural gas fired plants will provide more than 5,000 megawatts (MW) of power in coming years, improving regional air quality as they displace old coal- and oil-fired power plants. Similarly, the Hibernia oil and gas project off the coast of Newfoundland will aid in improving regional air quality through its use of low-sulfur oil.



In 1999, Canada consumed 12.52 quadrillion Btu (quads) of energy, representing 3.3% of total world primary energy consumption. In 1998, Canada's industrial sector consumed the largest amount of energy (48%), followed by the residential sector (17.7%), the transportation sector (18.9%) and the commercial sector (15.5%).

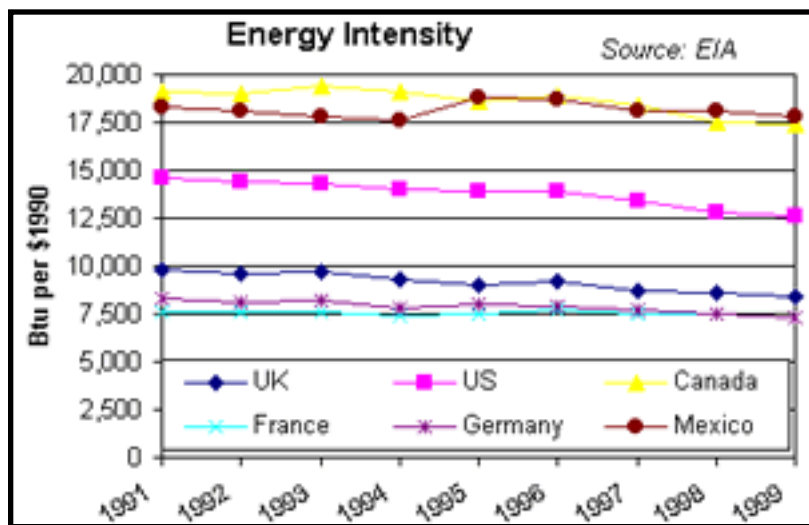


In 1999, Canada was one of the world's leading carbon emitting countries, emitting 150.9 million metric tons of energy related

carbon emissions (2.5% of the world total). In 1998, the industrial sector accounted for 40.3% of this, releasing 59.5 million metric tons of carbon. Within the industrial sector, the six energy-intensive industries (chemicals, petroleum refining, iron and steel, smelting and refining, pulp and paper and cement) accounted for over 80% of carbon dioxide emissions. Emissions from the transportation sector in 1998 totaled 48.8 million metric tons (mmt). While on-road vehicles are currently the primary consumer of fuel, off-road vehicles' (including activities associated with oil sands mining), contributions to carbon dioxide emissions are projected to grow appreciably in the future. The residential sector carbon emissions measured 20.6 mmt in 1998, while commercial sector carbon emissions were 18.8 mmt.

As part of a \$690 million commitment to lowering greenhouse gasses (GHG), the Canadian government, in 2001 announced a \$266 million plan to cut emissions of GHGs, its goal being to cut GHG emissions in Canada by more than 23.7 megatonnes by 2010. However, it is not clear how Canada will achieve the required cuts in its own greenhouse gas emissions.

Energy and Carbon Intensity

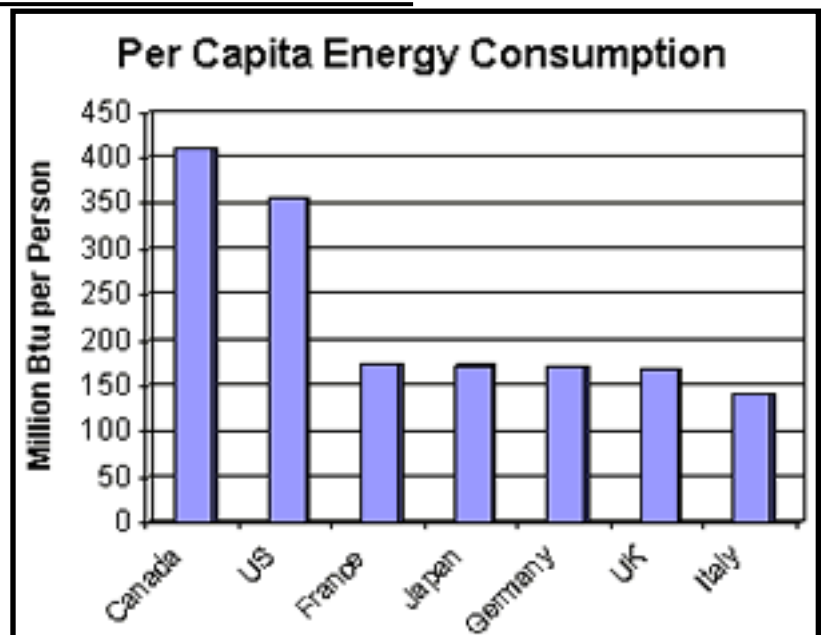


Canada relies heavily on energy intensive industries. In 1999, Canada's energy intensity (the amount of energy consumed per dollar of GDP) was 17,401 Btu per \$1990. Canada's energy intensity has been relatively close to Mexican levels (17,766 Btu/\$1990) over the past ten years. However, Canada's 1999 energy intensity was considerably higher than other industrialized nations such as the United States (12,638 Btu/\$1990), the United Kingdom (8,366 Btu/\$1990), Germany (7,281 Btu/\$1990), and France (7,324 Btu/\$1990).

Canada's carbon intensity, 0.21 metric tons of carbon per thousand \$1990, ranks second to Mexico (0.29 metric tons/\$1990) among North American countries. Canada's lower carbon intensity in comparison to other OECD countries partially reflects the country's relatively low reliance on carbon-intensive coal and greater dependence on hydroelectricity and nuclear power (which do not emit carbon) and natural gas (which emits relatively little carbon).

Per Capita Energy Consumption and Carbon Emissions

Canada's 1999 per capita energy consumption, 410.7 million Btu per person, was the highest in North America, above the U.S. level of 355.9 million Btu per person. Relative to other OECD countries, Canada's per capita energy consumption is considerably higher than the United Kingdom (167.8 million Btu per person), France (173.6), Japan (171.6), Germany (170.4), and Italy (139.7).



Canada's 1999 per capita carbon emissions of 4.9 metric tons (mt) were below the U.S. level of 5.6 mt/person, but high relative to France (1.8), Germany (2.8), the United Kingdom (2.6), Italy (2.1) and Japan (2.4). Per capita carbon emissions, while decreasing slightly from their 1980 level of 5.2 metric tons of carbon per person, have remained fairly steady over the past 15 years.

Renewable Energy

Renewable energy sources, such as hydroelectricity and wind-power, are beginning to gain much attention as Canada moves forward in its efforts to reduce GHG emissions. In 1999, Canada's electricity sector was dominated by hydroelectric power generation that accounted for 60% of the total, followed by thermal electric generation (26.4%), nuclear (12.3%). Other renewable energy sources, such as

geothermal, solar, wind, wood, and waste, accounted for 7.5%.

Although there are still plans to add some large-scale hydroelectric power in Canada, these projects are slowly giving way to smaller-scale projects. This shift in energy policy is partially due to environmental concerns, such as inundation of important ecological zones and the displacement of agricultural lands. Increased hydro-power production has important implications for GHG emissions, since hydroelectricity does not release carbon dioxide.

Wind energy use is increasing in Canada. In September 1999, Le Nordais, Canada's largest windfarm with an installed power capacity of 100 megawatts (MW), was inaugurated. At full operating capacity, Le Nordais will supply 10,000 homes with electricity. Electricity production using wind power from Le Nordais will replace a quantity of fossil fuel that could produce up to 250,000 tons of carbon dioxide per year, thereby contributing to GHG reductions. The government is planning to increase Canada's installed wind energy generating capacity to 10,000 MW by 2010 in order to displace between 15 and 25 million tons per year of GHGs.

Outlook

According to the United States Energy Information Agency's (EIA) "International Energy Outlook 2001", Canadian energy consumption is expected to increase at an average annual percent change of 1.2% slightly less than projections for all of North America (1.4%) in the reference case projections. Total energy consumption is projected to be 127.0 quadrillion Btus by 2020.

According to these projections, Canadian natural gas consumption is expected to grow at a rate of 1.5%, nuclear energy at a rate of 1.7%, coal consumption will grow at an average annual rate of 0.4%, renewable at 1.8%. Canadian carbon emissions are expected to grow at an average annual rate of 0.9%.

Entering the 21st century, Canada is striving to be a leader in addressing environmental concerns. In 1999, the Canadian government illustrated its commitment to environmental protection with the release of a revised Canadian Environmental Protection Act (CEPA). The new Act focuses on pollution abatement and prevention and authorizes enforcement officers to deal with polluters who break the laws. Furthermore, it provides a "right to sue" the federal government if they fail to enforce new CEPA rules.

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February 2002

Canada

Canada is a net exporter of oil, natural gas, coal, uranium, and hydropower. It is one of the most important sources of U.S. energy imports.

Note: Information contained in this report is the best available as of February 2002 and can change.



BACKGROUND

Canada is expected to show a small decline in gross domestic product (GDP) in the first quarter of 2002, but the country's economy is expected to rebound quickly. Like its southern neighbor, the United States, the Canadian economy suffered in 2001 from the sharp decline in its technology sector. In addition to the adverse effects of the domestic high technology industry collapse, slower world economic growth, and especially slow (or negative) growth in the United States, are having negative ramifications on the highly trade-dependent Canadian economy.

Economists have credited Canada for making sound tax and interest

rate decisions that will help lift the country from its small recession. If the U.S. economy recovers in the second half of 2002, as many predict, the Canadian economy is predicted to grow by 1.1% in 2002.

ENERGY OVERVIEW

Canada was the fifth-largest energy producer in the world in 1999, behind the United States, Russia, China, and Saudi Arabia. Over the past two decades, Canada has become a significant net energy exporter. In 1999, about 30% of Canadian energy production was exported, with the United States by far its main customer. From January-November 2001, the United States imported more oil (including crude oil and petroleum products) from Canada than from any other country. The United States consumed 3.155 trillion cubic feet (Tcf) of Canadian natural gas in the first eleven months of 2001, with 93% of total U.S. gas imports coming from Canada. In 1999, about 36% of Canada's primary energy production was natural gas,

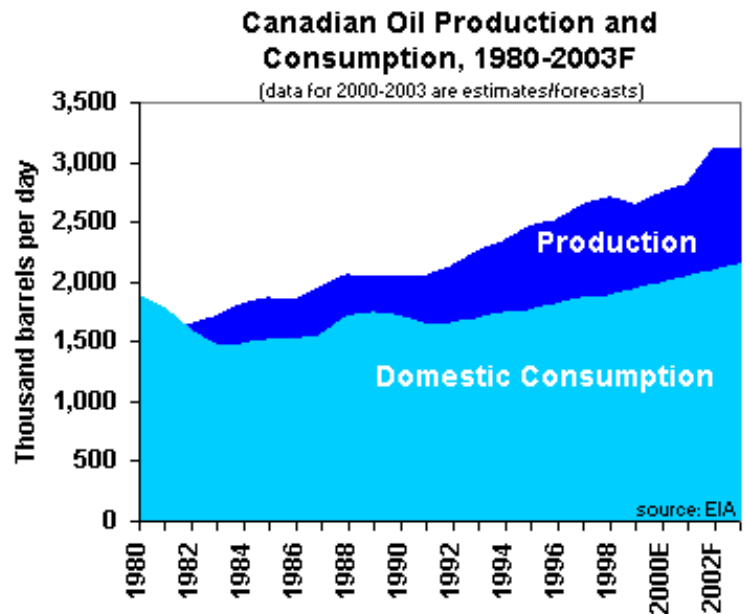
followed by oil (23%), hydropower (20%), coal (11%), and nuclear power (4%). Over two-thirds of Canada's energy is produced in the province of Alberta.

Canada also is a significant energy consumer and a member of the International Energy Agency (IEA). It was the world's sixth-largest energy consumer in 1999, roughly on par with India in terms of total energy consumption.

The Canadian energy industry is undergoing a period of reorganization, with consolidation in the oil and natural gas sectors and privatization in the electricity sector. While geography inhibits the development of a national electricity market within Canada, there is significant trade with the United States and potential for strong north-south regional markets, involving several Canadian provinces and adjacent U.S. states.

OIL

Canada has proven conventional oil reserves of 4.4 billion barrels, as of January 2002, a 152 million barrel increase over January 2001 levels. Oil production averaged 2.8 million barrels per day (bbl/d) during 2001, with estimated consumption of 2.0 million bbl/d. The province of Alberta, located in western Canada, is by far the country's leading oil producer. While Alberta's light oil reserves are declining (the province now contains an estimated 45% of the country's light oil reserves), there are huge oil sands deposits. Meanwhile, projects and potential projects in other provinces are shifting the oil industry focus to include the eastern and northern parts of the country.



Canada is a major source of U.S. oil imports. From January through November 2001, the United States imported 1.8 million bbl/d of crude oil from Canada (1.3 million bbl/d of which was crude oil). This makes Canada the top petroleum supplier to the United States and the third-largest supplier of crude oil imports (behind Saudi Arabia and Mexico, and ahead of Venezuela). Canada has been the top supplier to the United States of refined petroleum products, including jet fuel, distillate, etc., in the last few years.

The Canadian oil industry is in the midst of consolidation, reducing the number of active companies. Companies operating in Canada include Exxon's Imperial Oil, Royal Dutch/Shell's Shell Canada, Petro-Canada, and Suncor. Two of the largest companies, Alberta Energy and PanCanadian, began merger discussions in January 2002. If the deal goes through, the new company reportedly will become the largest independent North American producer.

Exploration and Production

Western Canada, and more specifically Alberta, remains the premier energy producing region in Canada. The Western Canadian Sedimentary Basin, underlying Alberta, Saskatchewan, and part of the Northwest Territories, has been the main source of Canadian oil production for the last 50 years. An estimated 55% of Canada's conventional oil production in 2000 came from Alberta. Conventional oil production has been declining in the west as it has been rising in the east in the last few years. However, as east coast projects are more expensive and develop smaller reserves, focus is expected to shift back toward the western part of the country in coming years.

Exploration and production activity on Canada's east coast is focused on the Jeanne d'Arc Basin, offshore

Newfoundland. The climate demands technologically advanced offshore oil platforms, able to withstand extremely cold temperatures and high winds, which add to production costs. The first project in the area, the Hibernia field, came onstream in 1997 and produces around 150,000 bbl/d of light, sweet crude. Hibernia was subject to repeated delays, and grants totaling about \$625 million from the federal government helped the project progress. ExxonMobil is the operator, with joint venture partners Chevron Canada Resources, PetroCanada, Canada Hibernia Holding Corporation, Murphy Oil, and Norsk Hydro.

The second project in the Jeanne d'Arc Basin, Terra Nova, began production in January 2002 after several delays. Terra Nova is about 30 miles away from the Hibernia field. The field currently has a capacity of 110,000 bbl/d and is expected to produce for about 15 years. Terra Nova is owned by PetroCanada (operator), ExxonMobil, Husky Oil Operations, Norsk Hydro, Murphy Oil Company, Mosbacher Operating, and Chevron Canada Resources.

There are two more Jeanne d'Arc fields, White Rose and Hebron. The White Rose field is expected to be the third Grand Banks development, beginning production in 2004, although concerns remain that development will be prohibitively expensive. The field could reach a projected 90,000 bbl/d at peak production. Finally, Chevron Canada Resources decided in February 2002 to defer development at the Hebron field, for financial reasons. Hebron contains heavier oil than Hibernia and Terra Nova.

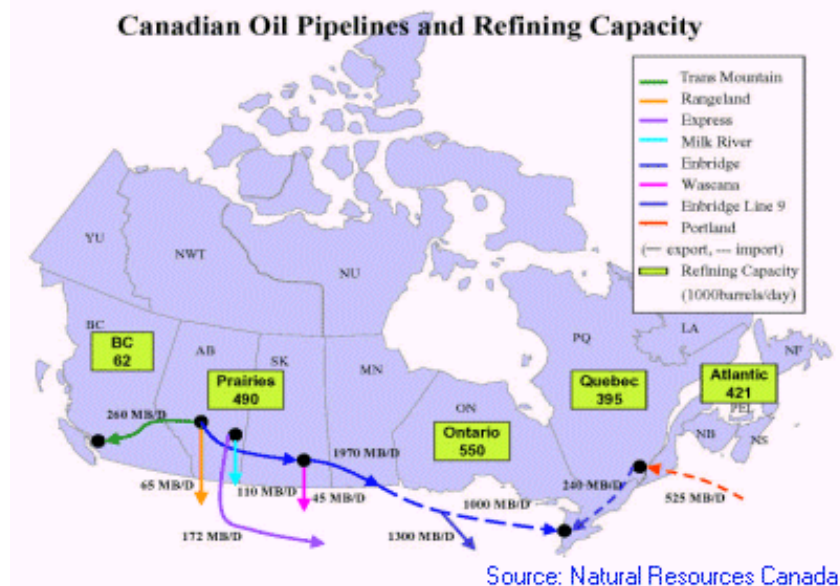
On the west coast, a provincial British Columbia agency plans to review a 30-year-old ban on exploration in the Pacific Ocean. The area near Queen Charlotte Island is thought to hold as much as 10 billion barrels of oil as well as significant reserves of natural gas. This has the potential to make the area a larger oil and gas producer than the Jeanne d'Arc Basin.

Synthetic Crude Oil

Much of the exploration in Alberta in coming years likely will be for heavy crude and oil sands, as conventional oil reserves are being depleted. Unlike conventional oil, oil sands are a mixture of bitumen, sand, water and clay. The bitumen, a thick and tar-like hydrocarbon, surrounds the sand and water. To develop oil sands, bitumen is separated from the sand, water and clay. Once separated, bitumen can be upgraded into a high-quality oil called "synthetic crude." One of the largest synthetic crude producers, Syncrude (a joint venture of Alberta Energy, Canadian Oil Sands Investments Inc., Conoco, Imperial, Mocal Energy, Murphy Oil, Nexen, and Petro-Canada), reported an average production cost of about \$11.50/bbl in 2001.

Canada holds around 2 trillion barrels of oil sands. The Athabasca Oil Sands deposit, in northern Alberta, is one of the two largest oil sands deposits in the world (the other is in the Orinoco Belt, Venezuela). There are also oil sands deposits on Melville Island, in the Canadian Arctic, and there are three smaller deposits in northern Alberta.

Current output of synthetic crude and bitumen is estimated at 600,000 bbl/d. According to the Canadian government, synthetic oil and bitumen production is expected to reach 1.2 million bbl/d by 2010.



Pipelines

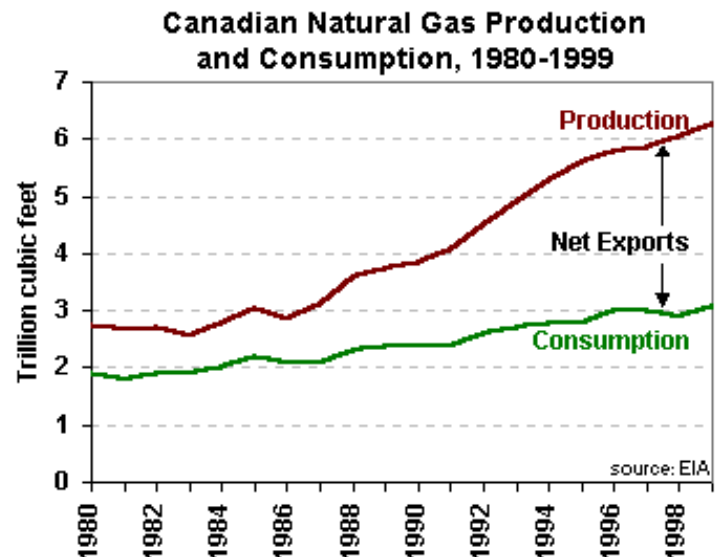
Although most Canadian oil is produced in western Canada (Alberta), oil is consumed primarily in central and eastern Canada. As a result, Canada exports oil from Alberta and imports oil on the east coast, explaining why Canada exports over 1 million bbl/d (gross) to the United States but has net exports of less than 1 million bbl/d. Furthermore, there is an extensive pipeline system to transport western oil to eastern Canadian and U.S. markets. There are two major pipeline networks. The first is Enbridge

Pipelines Inc. (formerly Interprovincial Pipe Line-IPL), an 8,700-mile network of piping and terminals, delivering oil from Edmonton, Alberta, east to Montreal, Quebec and eastern Canada and the U.S. Great Lakes refineries and markets. It is one of the largest crude oil and petroleum liquids pipeline systems in the Western Hemisphere, and there are plans to expand its U.S. export capacity. The other major pipeline system is the Trans Mountain Pipe Line (TMPL), which delivers oil mainly from Alberta west to refineries and terminals in the Vancouver, British Columbia area, as well as to the Puget Sound area of Washington state.

BC Gas announced in January 2002 that it intends to build a new pipeline to transport bitumen from mines and refineries near Fort McMurray to pipelines and processing plants in the Edmonton area. The proposed pipeline would cover about 320 miles and cost about \$625 million. BC Gas predicts that if regulatory approval is granted in early 2003, the pipeline could come onstream by 2005.

NATURAL GAS

Canada holds about 59.7 trillion cubic feet (Tcf) of proven natural gas reserves. Canada currently produces about 6.3 Tcf of natural gas per year, making it the world's third largest natural gas producer (after the United States and Russia) and second largest natural gas exporter (after Russia). Canada's natural gas exports go almost exclusively to the United States. Canadian natural gas consumption is projected to grow significantly in coming decades, largely for use in electricity generation. As natural gas production and infrastructure grow, there is a potential for emergence of a unified North American natural gas market.

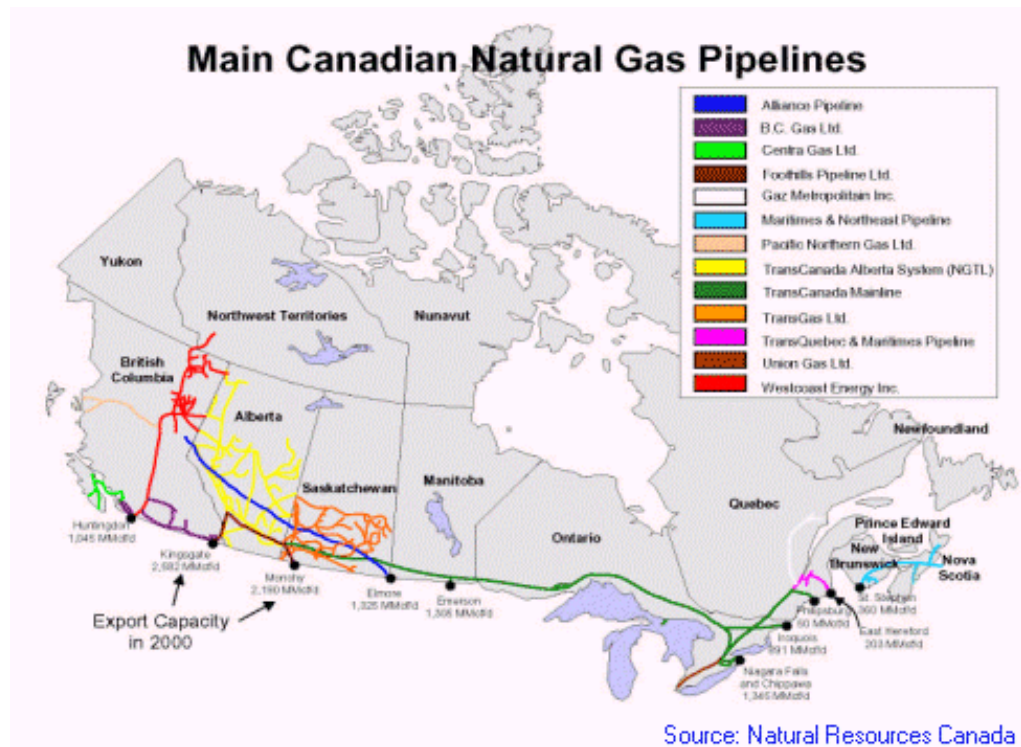


Exploration and Production

Like the oil industry, Canada's natural gas industry is based primarily in Alberta, reaching into neighboring Saskatchewan, British Columbia, and the southern Northwest Territories. Saskatchewan is expected to become an increasingly important natural gas province in coming years. Atlantic Canada is a newer industry focal point. Nova Scotia's Sable Island and offshore Newfoundland hold significant natural gas reserves.

Sable Island Offshore Energy, a consortium led by Mobil Canada and including Shell Canada, Imperial Oil, Nova Scotia Resources and Mosbacher Operating, began production in January 2000. About 550 million cubic feet per day of natural gas is pumped from three reservoirs at Sable Island's Thebaud platform. Shell had originally estimated Sable reserves to hold 1.1 Tcf, but in January 2002 that estimate was revised downwards to 0.8 Tcf.

The Arctic Northwest Territories and the Yukon are thought to hold great potential for new gas discoveries. While the territories are unlikely to exceed Alberta's production, as Alberta becomes increasingly mature the territories represent a major potential new source of gas. Calgary-based Berkley Petroleum, Chevron Canada, and Ranger Oil all have made discoveries in the Northwest Territories. The Mackenzie Delta area of the Northwest Territories reportedly could hold as much as 65 Tcf of natural gas.



Pipelines

There has been considerable progress in recent years on natural gas interconnections between Canada and the United States. The Northern Border Pipeline, an extension of the Nova Pipeline, came onstream in late 1999 and connects to Chicago through the upper Midwest. The Maritimes and Northeast Pipeline came onstream in January 2000, running from Sable Island to New England, with further extensions into New England planned. In February 2002, Enbridge shelved plans to build a pipeline connection between Sable Island and Quebec.

The \$2.5-billion Alliance Pipeline, at 1,875 miles, is the longest pipeline ever built in North America, and is designed to carry about 1.3 billion cubic feet per day (Bcf/d) of gas from western Canada (Fort St. John, British Columbia) to the Chicago area. The pipeline began commercial service on December 1, 2000. The U.S. utility Pacific Gas & Electric imports natural gas from British Columbia via the Alliance pipeline.

The Millennium Pipeline remains in the regulatory approval stage of development; it is slated to connect Canadian sources to southern New York and Pennsylvania. Indecision over the final route of the pipeline in New York currently is stalling progress.

Exploration and production activity in the Mackenzie Delta, Beaufort Sea, and Alaskan North Slope has sparked interest in an Arctic pipeline. Combined Alaskan and Canadian assets in the area stand at about 40 Tcf of proven reserves, with far more probable reserves. Alaskan, Yukon, and Northwest Territory

governments all support different routes, with various companies vying for their chosen routes.

Low natural gas prices as of February 2002 appear to be having a negative effect on the prospects for Arctic pipeline development. BP, formerly one of the companies most publicly committed to an Alaska pipeline, now has stated that the pipeline is not a good project in the current price environment. However, in January 2002, the Mackenzie Delta Producers Group, led by Imperial Oil, announced that it is seeking regulatory approval the Mackenzie line, to connect to Alberta. TransCanada Pipelines and Enbridge, Canada's two largest pipeline companies, remain interested in building outlets for northern gas.

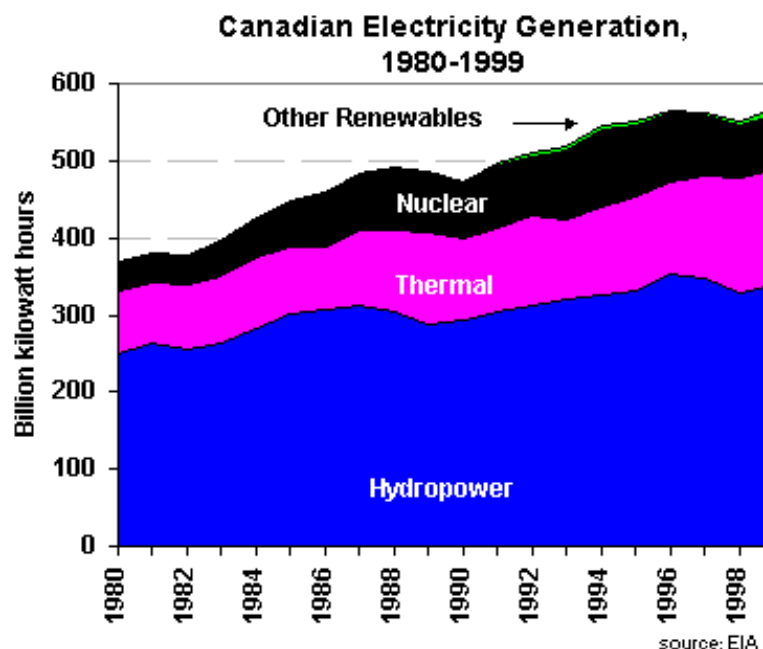
COAL

Canada is a major coal producer and consumer, with estimated 1999 output of 79.9 million short tons (Mmst), consumption of about 63.4 Mmst, and reserves of 9.5 billion short tons. About 80% of Canada's coal exports are for metallurgical purposes, with the vast majority purchased by Japan (60%) and South Korea (16%). Alberta accounts for about half of Canada's coal production, while British Columbia and Saskatchewan account for about 30% and 15%, respectively. Bituminous coal makes up about half of Canada's coal output, with sub-bituminous (about one-third) and lignite the rest. Canadian coal consumption is primarily (87%) for electricity generation, with the remainder mainly used for steel-making.

ELECTRICITY

Canadian electricity generation in 1999 totaled 567.2 billion kilowatt hours (bkwh), of which 60% was hydropower, 26% was conventional thermal power (oil, gas, and coal), 12% was nuclear generation, and 1% was derived from other renewable sources. Canada was the largest producer of hydropower in the world in 1999, and hydro sources are not yet believed to be fully exploited. Trends in coming years are expected to favor thermal power generation, mainly from natural gas. The Canadian nuclear power industry has declined to 69.8 bkwh in 1999 since its peak of 102.4 bkwh in 1994. Ontario contains the bulk of Canadian nuclear capacity.

Canada exported about 42.9 bkwh of electricity to the United States in 1999, mostly from Quebec, Ontario, and New Brunswick to New England and New York. Smaller volumes are exported from British Columbia and Manitoba to Washington state, Minnesota, California, and Oregon. There is considerable reciprocity between the Canadian and U.S. power markets, as the United States also exports smaller volumes of electricity to Canada.



Natural gas-fired power plant construction is on the rise in Canada, preparing for a three-fold increase in gas power generation in the next decade, as predicted by the Canadian Energy Research Institute. PanCanadian Petroleum, TransAlta, EPCOR, and ATCO Power are all in various stages of developing new (mostly cogeneration) gas-fired plants in Alberta and Saskatchewan.

Under Canada's constitution, electricity is primarily within the jurisdiction of the provinces. In most provinces, the bulk of generation, transmission, and distribution is provided by a few

dominant utilities. Although some of these utilities are privately owned, most are owned by the provinces. There is also limited independent power producer (IPP) generation, mostly for sales to the larger utilities.

Alberta and Ontario, which together account for about half of Canada's electricity market, have introduced legislation to deregulate their power sectors. Alberta is much further along in the deregulation process. It was the first province to introduce privatization legislation in 1995, and a 1998 amendment to the original legislation allowed retail customers to choose their electricity suppliers beginning January 1, 2001.

Ontario introduced privatization legislation in 1998, and deregulation is set to commence in the province in May 2002. Ontario's Hydro One utility, the successor to the province's Crown monopoly Ontario Hydro, is slated for initial public offering (IPO) in 2002. It is expected to be Canada's largest-ever IPO.

Quebec and British Columbia do allow third party access to their electricity grids as the result of trade agreements with the United States, but neither province has plans to break up its utility monopoly.

ENVIRONMENT

Canada's energy abundance has encouraged the development of a highly fuel-intensive economy based on natural resource extraction and processing. This heavy reliance on energy-intensive industries has led to serious environmental concerns, primarily regarding [air pollution](#) and climate change.

In 1999, Canada consumed 12.5 quadrillion Btu of [energy](#) and emitted 150.9 million metric tons of [carbon](#). The industrial sector was the primary emitter of carbon dioxide and within the sector, six [energy intensive](#) industries accounted for over 80% of these emissions. [Per capita](#) energy consumption ranks fourth among OECD countries, and per capita carbon emissions rank third.

Entering the [21st century](#), Canada is proving to be a leader in addressing environmental concerns. [Renewable](#) energy sources, such as wind, are beginning to gain more attention as Canada works toward meeting international obligations to reduce greenhouse gas emissions.

COUNTRY OVERVIEW

Prime Minister: Jean Chretien (since 11/4/93)

Independence: July 1, 1867 (from UK)

Population (July 2001E): 31.6 million

Location/Size: Northern North America/3.85 million sq. miles (slightly larger than the United States)

Administrative divisions: 10 provinces and 3 territories*; Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Northwest Territories*, Nova Scotia, Nunavut*, Ontario, Prince Edward Island, Quebec, Saskatchewan, Yukon Territory*

Major Cities: Toronto, Montreal, Vancouver, Ottawa (capital), Edmonton, Calgary, Winnipeg, Quebec

Languages: English (official), French (official)

Ethnic Groups: British Isles origin (40%), French origin (27%), other European (20%), indigenous Indian, Eskimo (1.5%)

Religions: Roman Catholic (45%), Protestant (41%)

Defense (8/98): Army (20,900), Navy (9,000), Air Force (14,000), Other (15,700)

ECONOMIC OVERVIEW

Exchange Rate (2/21/01): \$1 U.S. = \$1.61 Canadian dollars

Gross Domestic Product (GDP, 2000E, \$U.S.): \$691.8 billion

Real GDP Growth Rate (2001E): 1.4% **(2002F):** 1.1%

Inflation Rate (consumer prices, 2002E): 1.4%

Unemployment Rate (2002F): 7.6%

Current Account Balance (2002E, \$U.S.): \$13.5 billion

Major Export Products: Motor vehicles and parts, newsprint, wood pulp, timber, crude petroleum, machinery, natural gas, aluminum, telecommunications equipment, electricity

Major Import Products: Machinery and equipment, crude oil, chemicals, motor vehicles and parts, durable consumer goods, electricity

Major Trading Partners: United States, European Union

ENERGY OVERVIEW**Minister of Natural Resources:** Herb Dhaliwal**Conventional Crude Oil Reserves (2002):** 4.4 billion barrels**Oil Sands Reserves (002):** 174.8 billion barrels**Oil Production (2001E):** 2.8 million bbl/d, of which 2.0 million bbl/d was crude oil**Oil Exports to the United States (January-November 2001):** 1.775 million bbl/d, 1.316 million bbl/d of which was crude oil**Oil Consumption (2001E):** 2.0 million bbl/d**U.S. Oil Imports from Canada (January-November 2001E):** 1.67 million bbl/d (of which 1.28 million bbl/d was crude)**Natural Gas Reserves (1/1/02):** 59.7 trillion cubic feet (Tcf)**Natural Gas Production (1999E):** 6.3 Tcf**Natural Gas Consumption (1999E):** 3.1 Tcf**Coal Reserves (12/31/96):** 9.5 billion short tons**Coal Production (1999E):** 79.9 million short tons (Mmst)**Coal Consumption (1999E):** 63.4 Mmst**Electric Generation Capacity (1/1/99):** 109.8 million kilowatts**Electricity Generation (1999E):** 567.2 billion kilowatt hours (60% hydro, 26% thermal, 12% nuclear, 1% geothermal and other)**ENVIRONMENTAL OVERVIEW****Minister of Environment:** David Anderson**Total Energy Consumption (1999E):** 12.5 quadrillion Btu* (3.3% of world total energy consumption)**Energy-Related Carbon Emissions (1999E):** 150.9 million metric tons of carbon (2.5% of world carbon emissions)**Per Capita Energy Consumption (1999E):** 410.7 million Btu (vs U.S. value of 355.9 million Btu)**Per Capita Carbon Emissions (1999E):** 4.9 metric tons of carbon (vs U.S. value of 5.6 metric tons of carbon)**Energy Intensity (1999E):** 17,401 Btu/ \$1990 (vs U.S. value of 12,638 Btu/ \$1990)****Carbon Intensity (1999E):** 0.21 metric tons of carbon/thousand \$1990 (vs U.S. value of 0.20 metric tons/thousand \$1990)****Sectoral Share of Energy Consumption (1998E):** Industrial (48.0%), Residential (17.7%), Transportation (18.9%), Commercial (15.5%)**Sectoral Share of Carbon Emissions (1998E):** Industrial (40.3%), Transportation (33.0%), Residential (14.0%), Commercial (12.7%)**Fuel Share of Energy Consumption (1999E):** Oil (30.4%), Natural Gas (25.3%), Coal (11.6%)**Fuel Share of Carbon Emissions (1999E):** Oil (44.9%), Natural Gas (31.0%), Coal (24.1%)**Renewable Energy Consumption (1998E):** 3,850 trillion Btu***Number of People per Motor Vehicle (1998):** 1.8 (vs U.S. value of 1.3)**Status in Climate Change Negotiations:** Annex I country under the United Nations Framework Convention on Climate Change (ratified December 4th, 1992). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Canada has agreed to reduce greenhouse gases 6% below 1990 levels by the 2008-2012 commitment period.**Major Environmental Issues:** Air pollution and resulting acid rain severely affecting lakes and damaging forests; metal smelting, coal-burning utilities, and vehicle emissions impacting on agricultural and forest productivity; ocean waters becoming contaminated due to agricultural, industrial, mining, and forestry activities**Major International Environmental Agreements:** A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Law of the Sea and Marine Life Conservation

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear,

geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 1999.

OIL and GAS INDUSTRIES

Organization: private sector (major companies: ExxonMobil's Imperial Oil, Royal Dutch/Shell's Shell Canada, Petro-Canada, Suncor, PanCanadian, Alberta Energy).

Major Oil and Gas Producing Provinces: Alberta; British Columbia; Saskatchewan

Major Oil Pipelines: Trans Mountain; Enbridge

Oil Refining Capacity, January 2002: Ontario (560,200 bbl/d); Alberta (435,550 bbl/d); Quebec (394,900 bbl/d); New Brunswick (250,000 bbl/d); British Columbia (62,250 bbl/d); Newfoundland (105,000 bbl/d); Nova Scotia (84,000 bbl/d); Saskatchewan (52,000 bbl/d)

Major Gas Pipeline Companies: Enbridge, TransCanada PipeLines Ltd.

Sources for this report include: CIA World Factbook; Dow Jones; DRI/WEFA World Economic Outlook; Economist Intelligence Unit ViewsWire; Financial Times; Oil and Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; U.S. Energy Information Administration; World Markets Online.

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[U.S. Embassy in Canada](#)

[U.S. International Trade Administration, Country Commercial Guide - Canada](#)

[U.S. Department of Energy's Office of Fossil Energy's International section - Canada](#)

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